ORIGINAL RESEARCH ORİJİNAL ARAŞTIRMA

DOI: 10.5336/dentalsci.2024-106016

Evaluation of Quality of Life in Orthognathic Surgery Patients with Class II and Class III Malocclusions

Sınıf II ve Sınıf III Maloklüzyona Sahip Ortognatik Cerrahi Hastalarında Yaşam Kalitesinin Değerlendirilmesi

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This study was presented as an oral presentation at the 27th Congress of the European Association for Cranio-Maxillo-Facial Surgery, September 19, 2024, Rome, Italy

ABSTRACT Objective: Orthognathic surgery is a treatment that combines orthodontic and surgical approaches to correct skeletal discrepancies. The aim of this study was to evaluate the Quality of Life (QoL) of patients with Class II and Class III skeletal malocclusions who underwent orthognathic surgery using the Orthognathic QoL Questionnaire (OQLQ), and to determine the impact of the preoperative malocclusion type on patient satisfaction. **Material and Methods:** This prospective cross-sectional observational study included patients with Class II and Class III dentofacial deformities who underwent orthognathic surgery at Bezmialem Vakıf University Faculty of Dentistry between 2022-2023, with at least 6 months of follow-up after surgery. These patients completed the Turkish version of the OQLQ online. The relationship between the scores and the type of deformity was statistically evaluated. **Results:** A total of 69 patients (41 female, 28 male) were included in the study, with a mean age of 24.8±5.17 years. The mean OQLQ score for all patients was 13.6±15.3 (15.00±12.90 for Class II patients and 12.76±16.88 for Class III patients). No significant difference was observed in the mean scores between Class II and Class III patients, except for questions 4-12, where significant differences were noted (p=0.032, p=0.03). **Conclusion:** The results indicate that Class III patients were generally more satisfied after surgery, which was reflected in their lower scores. In contrast, Class II patients had more difficulty adapting to the new occlusion and experienced greater challenges with eating.

Keywords: Orthognathic surgery; quality of life; treatment outcome; patient comfort; dentofacial deformities

ÖZET Amaç: Ortognatik cerrahi, iskelet farklılıklarını düzeltmek için uygulanan, ortodontik ve cerrahi bir yaklaşımın bir kombinasyonudur. Bu çalışmanın amacı, ortognatik cerrahi geçiren Sınıf II ve Sınıf III iskeletsel maloklüzyona sahip hastaların yaşam kalitesini [Quality of Life (QoL)] Ortognatik Yaşam Kalitesi Anketi [Orthognathic QoL Questionnaire (OQLQ)] ile değerlendirmek ve preoperatif maloklüzyon tipinin hasta memnuniyeti üzerindeki etkisini ortaya koymaktır. **Gereç ve Yöntemler:** Bu prospektif kesitsel gözlemsel çalışmaya Bezmialem Vakıf Üniversitesi Diş Hekimliği Fakültesi'nde 2022-2023 yılları arasında ortognatik cerrahi operasyonu geçirmiş ve ameliyat sonrası en az 6 ay geçmiş Sınıf II ve Sınıf III dentofasiyal deformiteye sahip hastalar dâhil edilmiştir. Bu hastalardan çevrim içi olarak Türkçe versiyonu kullanılan OQLQ'yu doldurmaları istenmiştir. Anket sorularına verilen cevapların skorları ile deformite tipi arasındaki korelasyon istatistiki olarak değerlendirilmiştir. **Bulgular:** Çalışmaya 69 hasta (41 kadın, 28 erkek) dâhil edilmiştir. Ortalama yaş 24,8±5,17 yıl olup tüm hastaların ortalama OQLQ skoru 13,6±15,3 (Sınıf II hastalarda 15,00±12,90 ve Sınıf III hastalarda 12,76±16,88) olarak bulunmuştur. Sınıf II ve Sınıf III deformiteli hastalar arasında ortalama skorlar açısından anlamlı bir fark bulunmamış, yalnızca 4 ve 12. sorularda anlamlı farklar gözlemlenmiştir (p=0,032, p=0,03). **Sonuç:** Sonuçlar, ameliyat sonrası Sınıf III deformiteli hastaların genellikle daha memnun olduğunu ve bu durumun daha düşük skorlarla yansıdığını göstermektedir. Buna karşılık, Sınıf II deformiteli hastaların yeni oklüzyon düzenine uyum sağlamada daha fazla zorlandığı ve yemek yeme konusunda daha fazla sıkıntı yaşadığı görülmüştür.

Anahtar Kelimeler: Ortognatik cerrahi; yaşam kalitesi; tedavi sonucu; hasta konforu; dentofasiyal deformiteler

TO CITE THIS ARTICLE:
Akkoyun EF, Pergel T, Kaşarcıoğlu G, Özbek Ö. Evaluation of quality of life in orthognathic surgery patients with Class II and Class III malocclusions. Turkiye Klinikleri J Dental Sci. 2025;31(2):182-8.

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Peer review under responsibility of Turkiye Klinikleri Journal of Dental Sciences.

Received: 21 Oct 2024 ***Received in revised form:*** 11 Mar 2025 ***Accepted:*** 12 Mar 2025 ***Available online:*** 22 Apr 2025

Dentofacial deformities arise due to variations in the shape and size of the jaws, resulting in dental misalignments and facial disharmony.[1] These deformities cause functional challenges, such as difficulties with chewing, negatively impact facial aesthetics, and result in social consequences. Patients with dentofacial deformities often struggle with low self-respect, increased stress, and difficulties in social interactions.[2] Additionally, they experience higher rates of depression, chronic pain, and temporomandibular disorders (TMD), all of which significantly affect their Quality of Life (QoL).[3]

Orthognathic surgery is a combined orthodontic and surgical approach designed to correct skeletal discrepancies, thereby improving facial appearance, bite alignment, and airway volume.[1] This procedure enhances facial structure and aesthetics, leading to increased social acceptance and improved psychological well-being.[4,5] Assessing a patient's motivation and managing their expectations before surgery is crucial for achieving a successful treatment outcome.[4] Enhancing the overall well-being of individuals with dentofacial deformities remains a fundamental objective of treatment. For comprehensive care, surgeons should focus not only on improving aesthetics and function but also on addressing the psychosocial aspects of treatment.[2,6]

Most studies have prioritized objective assessments of surgical outcomes, leaving a gap in understanding how patients actually perceive their experiences. To bridge this gap, it is essential to use reliable and sensitive tools that assess the impact of dentofacial deformities and their treatment on an individual's QoL.[5,7] QoL is a subjective concept that cannot be evaluated solely by external observation. The World Health Organization defines QoL as an individual's view of their life position within the context of their culture, expectations, personal goals, value systems, standards, and concerns.[8]

Several validated questionnaires have been developed to assess patient satisfaction following surgery. Among them, the Orthognathic QoL Questionnaire (OQLQ), developed by Cunningham et al. was specifically designed to measure the impact of dentofacial deformities on QoL.[9,10] The questionnaire was translated and validated in Turkish by Turna et al.[11] The OQLQ comprises 22 questions categorized into four domains: concerns related to facial aesthetics, social aspects of deformity, awareness of facial deformity, and oral function (Table 1). Patients rate each question on a 0-4 Likert scale based on their personal perceptions, where higher scores indicate poorer QoL, while lower scores reflect improved QoL.

TABLE 1: Overview of OQLQ domains and questions

Domains	Questions
Concerns related to the social aspects of the deformity	15. Cover mouth when meeting people
	16. Worry about meeting people for the first time
	17. Worry people will make hurtful comments
	18. Lack confidence socially
	19. Do not like to smiling
	20. Get depressed because of my appearance
	21. Sometimes think people are staring
	22. Comments about my appearance really upset me
Facial aesthetics	1. Self-conscious about the appearance of my teeth
	7. Do not like seeing the side-view of face (my profile)
	10. Dislike having photograph taken
	11. Dislike being seen on video
	14. Self-conscious about my facial appearance
Oral function	2 .Problems biting
	3. Problems chewing
	4. Avoid eating some foods
	5. Don't like eating in public
	6. Pains in face/jaw
Awareness of the facial deformity	8. Spend time studying face
	9. Spend time studying teeth
	12. Stare at people's teeth
	13. Stare at people's faces

The aim of this study was to assess the patients' QoL who underwent orthognathic surgery and to determine the impact of preoperative malocclusion type on patient satisfaction using OQLQ.

MATERIAL AND METHODS

This prospective cross-sectional observational study compares QoL scores between patients with skeletal Class II and Class III malocclusions who underwent orthognathic surgery. The study was approved by the Local Ethics Committee of Bezmialem Vakıf University (date: August 21. 2024, no: 2024/333) and conducted in accordance with the Principles of the

Declaration of Helsinki. An informed consent was obtained from all patients included in the study. Patients aged 18-40 who underwent bimaxillary orthognathic surgery for Class II and Class III dentofacial deformity at the Bezmialem Vakıf University Faculty of Dentistry, Oral and Maxillofacial Surgery Clinic, between 2022-2023, and had at least 6 months of follow-up after surgery were included in the study. All patients underwent Le Fort I and bilateral sagittal split ramus osteotomy by the same surgical team using the same surgical technique. Patients who had undergone genioplasty in addition to bimaxillary orthognathic surgery or single jaw surgery, patients with facial deformities other than jaw deformities, joint disorders or autoimmune diseases, posttraumatic or congenital facial deformity, cleft lip and palate, patients who had communication problems and those who did not wish to respond to the questionnaire were excluded from the study.

The Turkish adaptation of the 5-point Likert scale OQLQ was used.[11] The primary predictor variable was the preoperative deformity type of patients who have undergone bimaxillary orthognathic surgery. Other predictor variables were age and sex. The primary outcome variable was the mean total OQLQ score, while the secondary outcome variables included the mean scores for each OQLQ domain and individual question scores. An online questionnaire was created, and patients were provided with a link to complete the survey, evaluating the impact of orthognathic surgery on their QoL. Lower scores indicated better QoL (0 indicating ‘‘much better than before the surgery’’ and 4 ‘‘much worse than before the surgery’’). Patients were categorized into 2 groups based on deformity type Class II and Class III skeletal malocclusion patients). Postoperative questionnaire scores were subsequently analyzed to determine any correlation with the type of deformity.

STATISTICAL ANALYSIS

SPSS software (IBM Corp, USA, version 26.0) was used to perform all statistical analyses. Descriptive statistics, including mean values, standard deviations, and minimum-maximum values, were calculated. The normality of the data distribution was assessed using the Shapiro-Wilk test. The relationship between OQLQ scores and deformity type or sex was analyzed using the independent samples t-test and the Mann-Whitney test. Correlations between the scores and age were evaluated using Spearman’s correlation test. Statistical significance was set to a level of 0.05.

RESULTS

Sixty-nine patients were included in the study 47 of the participants were female and the other 22 were male and the mean age was determined as 24.8±5.17 years (minimum 18, maximum 40 years). Table 2 shows the age and sex distribution within the groups. No significant differences were observed between the groups in terms of mean age and sex distribution (p>0.05). 41 of the patients had Class II skeletal malocclusion, and 28 had Class III skeletal malocclusion. The mean duration between surgery and questionnaire was 8.54±3.25 months. The overall mean total score was 13.6±15.3, while the mean total scores were 15.00±12.90 for Class II patients and 12.76±16.88 for Class III patients.. Although there was no statistically significant difference between the groups in terms of domain scores (p=0.124), the scores were higher in Class II patients compared to Class III patients (Table 3). When analyzed on a question-by-question basis, a statistically significant difference between the groups was found specifically in questions 4 (*I often look carefully at other people’s teeth.*) and 12 (*I avoid eating certain foods because my bite makes it difficult.*) (p=0.032, p=0.03 respectively). No significant correlation was found between age and the total or domain scores of the OQLQ in the overall patient group (Table 4). However, In Class III patients, a negative correlation was found between age and the social aspects domain (Spearman’s rho= -0.451, p=0.016) and as well as the facial aesthetics

TABLE 2: Age and sex distribution by groups

	Age (years)	Sex	n
Class II patients	24.5±5.60	20 females, 8 males	28
Class III patients	25.05±4.91	27 females, 14 males	41
Total	24.8±5.17	47 females, 22 males	69
p value	0.414	0.793	

Depending on the normality of the data, either independent samples t-tests or Mann-Whitney U tests were used to compare the groups.

TABLE 3: Comparison of OQLQ total and domain scores between Class II and Class III patients with t-tests

	Social aspects	Facial esthetics	Oral function	Awareness of facial deformity	Total score
Class II patients	3.10±5.52	3.57±4.26	3.14±3.62	5.25±4.05	15.00±12.90
Class III patients	3.04±5.87	3.39±5.41	2.66±3.84	3.61±4.19	12.76±16.88
p value	0.876	0.351	0.319	0.900	0.124

Depending on the normality of the data, either independent samples t-tests or Mann Whitney U tests were used to compare the groups.

TABLE 4: Correlation between age and OQLQ total and domain scores

		Social aspects	Facial esthetics	Oral function	Awareness of facial deformity	Total score
Overall age	Correlation coefficient	-1.118	-0.098	0.034	-0.011	-0.035
	Sig. (2-tailed)	0.332	0.421	0.783	0.927	0.776
Age of Class II patients	Correlation coefficient	0.141	0.099	0.132	0.017	0.161
	Sig. (2-tailed)	0.380	0.539	0.411	0.916	0.314
Age of Class III patients	Correlation coefficient	-0.451*	-0.381*	-0.054	0.020	-0.252
	Sig. (2-tailed)	**0.016**	**0.046**	0.785	0.920	0.196

*Correlation is significant at the 0.05 level (2-tailed), based on Spearman's rho.

TABLE 5: Sex-based comparison of OQLQ total and domain scores in overall sample and within deformity groups

	Sex	Social aspects	Facial esthetics	Oral function	Awareness of facial deformity	Total score
Mean rank for all patients	Female	36.29	35.88	40.18	36.64	37.45
	Male	32.25	33.11	23.93	31.50	29.77
p value*		0.408	0.577	**0.001**	0.315	0.138
Mean rank for Class II patients	Female	22.94	22.59	25.69	21.74	23.70
	Male	17.25	17.93	11.96	19.57	15.79
p value*		0.151	0.246	**0.001**	0.596	**0.045**
Mean rank for Class III patients	Female	13.85	13.53	14.90	15.15	13.70
	Male	16.13	16.94	13.50	12.88	16.50
p*		0.533	0.328	0.709	0.533	0.438

*Mann-Whitney U test (2-sided test)

domain (Spearman's rho=-0.381, p=0.046). This indicates that as age increased, satisfaction in these domains also increased among Class III patients. In the overall patient group, a significant difference was found between male and female patients in the oral function domain, with females having higher mean scores than males. Similarly, in the Class II patients, a significant difference was observed in the oral function domain, where female patients had higher mean scores than male patients. Additionally, in Class II patients, the total OQLQ score was significantly higher in females than in males. However, in the Class III group, no significant differences were observed between male and female patients in any of the scores (Table 5).

DISCUSSION

Studies have demonstrated that orthognathic surgery leads to improvements in patients' QoL, particularly in oral function and facial aesthetics, as assessed by various questionnaires such as the Medical Outcomes Study-36-Item Short-Form Health Survey, the Oral Health Impact Profile (OHIP), and its shorter version, the OHIP-14, as well as the most widely used OQLQ, developed and validated by Cunningham et al.[9,10,12-14]

Patients with dentofacial deformities experience impaired masticatory function and a reduction in overall masticatory efficiency. However, both of these aspects show improvement after undergoing orthognathic surgery.[15] Rezaei et al. conducted a comprehensive evaluation to determine the effects of orthodontic intervention on mental health and body image.[16] The study findings revealed that orthodontic treatment had a substantial positive impact on individuals' mental well-being and their multifaceted perceptions of body image. Pahkala and Kellokoski's findings indicated that orthognathic surgery has the potential to effectively alleviate symptoms associated with TMD and pain, leading to improvements in facial aesthetics and chewing function. Moreover, most patients expressed satisfaction with the overall outcome of the treatment.[17] Since preoperative OQLQ scores were not available in this study, the differences between preoperative and postoperative QoL could not be calculated. Consequently, the extent of improvement in patients' QoL following surgery could not be determined. However, considering that the mean total score was 13.6±15.3 out of 88, it can be inferred that patient satisfaction was generally high.

In the present study, the evaluation of postoperative satisfaction was conducted regarding the preoperative dentofacial deformity types of patients using the Turkish-validated version of OQLQ. In various studies, QoL assessments have been conducted based on differences in preoperative skeletal deformity types. However, most of these studies have primarily used the OHIP-14.[18,19] Since the OHIP-14 was not designed to assess orthognathic surgery outcomes, using a questionnaire specifically tailored for this purpose, such as the OQLQ, may provide greater sensitivity, capture more significant improvements, and serve as a more accurate assessment tool.[19] In the metaanalysis conducted by Duarte et al. studies utilizing different questionnaires were analyzed, and no significant difference in QoL was observed between Class II and Class III patients during follow-ups conducted between the 4th and 7th months.[20] However, none of these studies evaluated postoperative QoL differences between Class II and Class III patients using a single assessment method. In our study the mean total score and mean scores of all domains were higher in Class II patients compared to Class III patients, indicating a higher satisfaction and QoL in Class III patients. Although the differences in QoL scores between groups were not statistically significant, the relatively higher satisfaction in Class III patients may be attributed to their greater preoperative functional and aesthetic impairment, leading to more noticeable postoperative improvements. Moreover, previous studies have suggested that Class III patients tend to have lower preoperative expectations compared to Class II patients, which could further explain their higher postoperative satisfaction levels.[6,21] Additionally, since the severity of the deformity was not assessed in our study, there is a possibility that mild Class II patients were compared with more severe Class III patients, potentially influencing the observed results.

Al-Asfour et al. reported that the mean OQLQ scores of males were higher than those of females in the 3 domains (self-awareness of the deformity, social aspect, and facial aesthetics).[21] On the other hand Choi et al. reported no significant differences between male and female patients in their study.[22] In the present study, however, a statistically significant difference was observed between sex and oral function domain scores, with females scoring higher than males, whereas no differences were observed in the other domains. In Class II patients, a significant difference was observed between males and females in the oral function domain and total score, while no significant differences were found in the other domains. In Class III patients, no statistically significant differences were detected in any of the scores. The significant difference in oral function domain scores between female and male patients may be attributed to biological, psychological, and methodological factors. Females generally have lower masticatory muscle mass and may experience greater sensitivity to postoperative functional changes, leading to higher scores. Additionally, psychological factors, such as differences in self-assessment tendencies and expectations, could contribute to this finding. Since OQLQ is a subjective assessment tool, females may be more attentive to functional changes, influencing their responses. Future studies with larger and more balanced sample sizes should further investigate

sex/gender-related differences in post-surgical oral function.

In the overall patient group, no correlation was found with age, consistent with the findings of Tüz et al. study.[23] However, in Class III patients, there was a negative correlation between age and the social aspects of the deformity and facial aesthetics domain scores, indicating that satisfaction increased with age. In Class II patients, no significant correlation was found between age and total or domain scores. This may be attributed to the fact that Class II patients generally have less pronounced skeletal deformities compared to Class III patients, resulting in less noticeable postoperative changes. Additionally, while older Class III patients may perceive greater aesthetic improvements due to the correction of severe mandibular discrepancies, the impact of age on satisfaction in Class II patients may be less pronounced. Furthermore, the limited sample size in this subgroup may have influenced the ability to detect potential correlations.

Although the OQLQ data in this study were collected prospectively, patient selection was conducted through a retrospective database review. The number of available patients for OQLQ scoring was limited to those who could be reached, as specified in the study. Therefore, a formal power analysis was not performed. Given this limitation, future studies with larger sample sizes are recommended to enhance statistical power and strengthen the validity of the findings. Another limitation of this study is that the questionnaire was administered online, which may have affected comprehensibility compared to face-to-face administration. Additionally, since preoperative OQLQ scores were not collected, direct comparisons between pre- and postoperative states were not possible. Instead, patients provided retrospective self-assessments of their QoL by comparing their current condition to their preoperative state. Furthermore, while patients were categorized into 2 groups based on deformity type, the severity of deformity was not considered. This is important, as the severity of dentofacial deformities may impact both patient satisfaction and QoL following surgery.

CONCLUSION

According to the results of this study although-the differences were not statistically significant, Class III patients had lower scores, indicating higher postoperative satisfaction. This may be attributed to their greater preoperative skeletal discrepancies, leading to more noticeable functional and aesthetic improvements after surgery. In contrast, Class II patients experienced more difficulty adapting to the new occlusion and reported greater challenges in eating. Additionally, the tendency of Class II patients to focus more on others' teeth may be associated with lower postoperative aesthetic satisfaction compared to Class III patients. These findings highlight the importance of preoperative counseling to better manage patient expectations and improve postoperative adaptation.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Emine Fulya Akkoyun, Taha Pergel;* ***Design:*** *Güniz Kaşarcıoğlu, Emine Fulya Akkoyun;* ***Control/Supervision:*** *Emine Fulya Akkoyun, Güniz Kaşarcıoğlu;* ***Data Collection and/or Processing:*** *Güniz Kaşarcıoğlu, Ömer Özbek;* ***Analysis and/or Interpretation:*** *Taha Pergel, Emine Fulya Akkoyun;* ***Literature Review:*** *Emine Fulya Akkoyun, Taha Pergel, Güniz Kaşarcıoğlu, Ömer Özbek;* ***Writing the Article:*** *Emine Fulya Akkoyun, Güniz Kaşarcıoğlu;* ***Critical Review:*** *Emine Fulya Akkoyun, Taha Pergel.*

REFERENCES

1. de Leyva P, Eslava JM, Hernández-Alfaro F, Acero J. Orthognathic surgery and aligners. A comparative assessment of periodontal health and quality of life in postsurgical orthodontic treatment with aligners versus traditional fixed appliances: a randomized controlled trial. Med Oral Patol Oral Cir Bucal. 2023;28(3):e208-e216. [Crossref] [PubMed] [PMC]
2. Cordeiro LDS, Fanderuff M, Olsson B, Gilliet J, Bergamaschi IP, da Costa DJ, et al. Factors associated with quality of life before and after orthognathic surgery. Oral Surg Oral Med Oral Pathol Oral Radiol. 2024;137(4):338-44. [Crossref] [PubMed]
3. Al-Moraissi EA, Perez D, Ellis E 3rd. Do patients with malocclusion have a higher prevalence of temporomandibular disorders than controls both before and after orthognathic surgery? A systematic review and meta-analysis. J Craniomaxillofac Surg. 2017;45(10):1716-23. [Crossref] [PubMed]
4. Lazaridou-Terzoudi T, Kiyak HA, Moore R, Athanasiou AE, Melsen B. Long-term assessment of psychologic outcomes of orthognathic surgery. J Oral Maxillofac Surg. 2003;61(5):545-52. [Crossref] [PubMed]
5. Alves e Silva AC, Carvalho RA, Santos Tde S, Rocha NS, Gomes AC, de Oliveira e Silva ED. Evaluation of life quality of patients submitted to orthognathic surgery. Dental Press J Orthod. 2013;18(5):107-14. [Crossref] [PubMed]
6. Duarte V, Zaror C, Villanueva J, Werlinger F, Vidal C, Solé P, et al. Changes in health-related quality of life after orthognathic surgery: a multicenter study. Clin Oral Investig. 2022;26(4):3467-76. [Crossref] [PubMed] [PMC]
7. Ağırnaslıgil MÖ, Amuk NG. Sağlık Bilimleri Dergisi. Ortognatik cerrahi tedavide hasta psikolojisi ve hasta memnuniyeti [Patient psychology and satisfaction about orthognathic surgery treatment]. 2018;27(1):80-6. [Link]
8. The World Health Organization Quality of Life Assessment (WHOQOL): development and general psychometric properties. Soc Sci Med. 1998;46(12):1569-85. [Crossref] [PubMed]
9. Cunningham SJ, Garratt AM, Hunt NP. Development of a condition-specific quality of life measure for patients with dentofacial deformity: I. Reliability of the instrument. Community Dent Oral Epidemiol. 2000;28(3):195-201. [PubMed]
10. Cunningham SJ, Garratt AM, Hunt NP. Development of a condition-specific quality of life measure for patients with dentofacial deformity: II. Validity and responsiveness testing. Community Dent Oral Epidemiol. 2002;30(2):81-90. [PubMed]
11. Turna D, Benlidayı ME, Güney AÜ, Sertdemir Y. Validity and reliability of the Turkish version of the orthognathic quality of life questionnaire in patients with dentofacial deformity. Med Oral Patol Oral Cir Bucal. 2022;27(4):e351-e356. [Crossref] [PubMed] [PMC]
12. Guyatt GH, Feeny DH, Patrick DL. Measuring health-related quality of life. Ann Intern Med. 1993;118(8):622-9. [Crossref] [PubMed]
13. Slade GD, Spencer AJ. Development and evaluation of the Oral Health Impact Profile. Community Dent Health. 1994;11(1):3-11. [PubMed]
14. Slade GD. Derivation and validation of a short-form oral health impact profile. Community Dent Oral Epidemiol. 1997;25(4):284-90. [Crossref] [PubMed]
15. Abrahamsson C, Henrikson T, Bondemark L, Ekberg E. Masticatory function in patients with dentofacial deformities before and after orthognathic treatment-a prospective, longitudinal, and controlled study. Eur J Orthod. 2015;37(1):67-72. [Crossref] [PubMed]
16. Rezaei F, Masalehi H, Golshah A, Imani MM. Oral health related quality of life of patients with class III skeletal malocclusion before and after orthognathic surgery. BMC Oral Health. 2019;19(1):289. [Crossref] [PubMed] [PMC]
17. Pahkala RH, Kellokoski JK. Surgical-orthodontic treatment and patients' functional and psychosocial well-being. Am J Orthod Dentofacial Orthop. 2007;132(2):158-64. d . [Crossref] [PubMed]
18. Baherimoghaddam T, Tabrizi R, Naseri N, Pouzesh A, Oshagh M, Torkan S. Assessment of the changes in quality of life of patients with class II and III deformities during and after orthodontic-surgical treatment. Int J Oral Maxillofac Surg. 2016;45(4):476-85. [Crossref] [PubMed]
19. Sun H, Shang HT, He LS, Ding MC, Su ZP, Shi YL. Assessing the Quality of Life in patients with dentofacial deformities before and after orthognathic surgery. J Oral Maxillofac Surg. 2018;76(10):2192-201. [Crossref] [PubMed]
20. Duarte V, Zaror C, Villanueva J, Andreo M, Dallaserra M, Salazar J, et al. Oral health-related Quality of Life changes in patients with dentofacial deformities Class II and III after orthognathic surgery: a systematic review and meta-analysis. Int J Environ Res Public Health. 2022;19(4):1940. [Crossref] [PubMed] [PMC]
21. Al-Asfour A, Waheedi M, Koshy S. Survey of patient experiences of orthognathic surgery: health-related quality of life and satisfaction. Int J Oral Maxillofac Surg. 2018;47(6):726-31. [Crossref] [PubMed]
22. Choi WS, Lee S, McGrath C, Samman N. Change in quality of life after combined orthodontic-surgical treatment of dentofacial deformities. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2010;109(1):46-51. [Crossref] [PubMed]
23. Tüz HH, Ergezen E, Meral SE, Ekmekcioglu A, El H. Influence of orthognathic surgery on oral health and Quality of Life. J Craniofac Surg. 2022;33(2):548-51. [Crossref] [PubMed]